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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/988,452	11/16/2001	Satoshi Aoyagi	SIW-022RCE2	5172

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EXAMINER

WALKER, KEITH D

ART UNIT	PAPER NUMBER
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1795

MAIL DATE	DELIVERY MODE
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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 09/988,452	Applicant(s) AOYAGI ET AL.	
	Examiner KEITH WALKER	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 January 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 and 36 is/are pending in the application.
- 4a) Of the above claim(s) 1-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

Claims 1-34 & 36 are pending in the application with claims 1-34 withdrawn from consideration.

Claim 36 is pending examination and rejected for the reasons below.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

1. Claim 36 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The timeline for the method of operating the fuel cell is awkward and unclear and as such is not distinctly claimed. The controller supplies excess reactant "by determining a voltage of the fuel cell after a variation of electrical load". (Emphasis added) This voltage is determined based on a synthetic output. However, after the voltage is determined, which is "after a variation of electrical load", the reacting gas is supplied to the fuel cell "in advance of the variation of electrical load". (Emphasis added) It is unclear how the voltage is determined based on a synthetic output after the variation in load but the excess reactant is supplied to the fuel cell before the variation in the load, which is the first action required to start the process of determining the voltage.

Claim Interpretation

In light of the 112 rejection above, the claimed invention is being interpreted as best as can be ascertained by the instant specification without incorporating limitations of the specification into the claims. Therefore, the claim is interpreted to mean an excess amount of reactant is supplied to the fuel cell before the load changes based on a look-up table and based on the assumption that the load will increase thereby increasing a power demand on the fuel cell. Regarding the "assumption" part, this is the explanation used by applicant on the last paragraph of page 16 in the instant specification, "When a current in a variation of the current load is assumed to vary...". Furthermore, the excess reactant is interpreted as the amount of reactant needed to meet the new assumed load requirement above the reactant amount that would be required at constant load. Such that if the load does increase to the new assumed amount, that volume of reactant considered excess is reduced as the load uses the power produced by the fuel cell. Once the new assumed load is met no excess reactant exists since the fuel cell is producing the assumed power demand.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. As best understood, claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura et al. (5,964,309), in view of JP 08-214452 (Takeshi).

Kimura teaches a power supply system with a stack of fuel cells connected to a storage battery in parallel. The reacting gases are supplied to the fuel cell in amounts based on the estimated output of the fuel cell, the charge of the storage battery, and the amount of power required by a load. The feed amount includes the amount required for providing the required power to the load and a feed adjustment based on the estimation charge-discharge state of the storage battery (2:50-60). The storage battery may be charged by the fuel cell and/or supply energy to the load in addition to that supplied by the fuel cell (Figs. 1 & 7, Abstract). The fuel cell system determines the amount of reactants needed to supply the fuel cell based on the charge-discharge state of the battery. Thus, if the battery is in short supply of power, then a larger supply of reactants to the fuel cell is needed to overcome the shortage of reserve power in the battery (2:45-3:31). Reactant gases are supplied to the fuel cell based on target values of the motors and machinery used with an electric vehicle (8:15-41).

Kimura teaches the supplying reactants to the fuel cell based on the charge-discharge estimation of the battery and the estimation of the amount of load required (3:45-60). Kimura also teaches using this estimation process to prevent the shortage of reactant gas supplied to the fuel cell so a voltage drop does not occur (3:1-13). Two conclusions are ascertained by the teachings of Kimura. First, if the load requirements are over estimated then an excess amount of fuel is supplied to the fuel cell and the instant claims are met. Second, since Kimura teaches supplying reactants to the fuel

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cell based on estimated future load requirements and that a shortage of reactants creates an undesirable effect of a voltage drop, it would be obvious to one skilled in the art to provide an excess amount of reactant to the fuel cell to ensure a voltage drop does not occur and thereby always operating the fuel cell in a manner that meets the load's requirements.

However, Kimura fails to teach a capacitor that is directly connected to the fuel cell.

Takeshi teaches a hybrid power system in which batteries or electric double capacitors are charged by a fuel cell and provide additional power to a load ([0002-0004], [0010]). The current-voltage characteristics of the fuel cell and of the energy storage device (whether it be a battery or capacitor) inherently depend on their respective internal resistances (Ohm's Law: $V=IR$). The system evaluates the internal resistance of the capacitor and increases the reactants of the fuel cell to overcome the resistance of the capacitor ([0018-0019]). The capacitor is used to supply a temporary supplemental amount of power to the load due to an increase in the power requirements (Abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to would have recognized the ability of an electric double capacitor in the hybrid system as taught by Takeshi to perform the same function as the storage battery in the fuel cell power supply system as taught by Kimura because batteries and capacitors are equivalent means to provide additional power to a load and to be charged by fuel cells.

Response to Arguments

Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection. Applicant has amended the claims such that a new 112 rejection is required and as such a new rejection based on the same art is also required as discussed above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEITH WALKER whose telephone number is (571)272-3458. The examiner can normally be reached on Mon. - Fri. 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

K. Walker

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/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795